Amendments to the Claims

Please amend the claims, without prejudice, as follows, wherein underlining identifies added material and strikethroughs identify deleted material:

Listing of Claims:

1-2 (Cancelled).

3. (Currently Amended) ~~An arrangement as defined in claim 2~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the Laplacian generator module is configured to generate the Laplacian value L(k,j+1), for at least one of said points, said at least one of said points comprising a point on a boundary, crease line or the like in a triangular mesh representation, in accordance with

$$L(k,j+1) = \frac{1}{2}\left[c^{j+1}(k-1)+c^{j+1}(k+1)\right]-c^{j+1}(k)$$

where $c^{j+1}(k)$ represents the position of the point for which the Laplacian is being generated in the finer level mesh representation, and $c^{j+1}(k-1)$ and $c^{j+1}(k+1)$ represent the positions of neighboring points in the finer level mesh representation.

4. (Currently Amended) ~~An arrangement as defined in claim 2~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the Laplacian generator module is configured to generate the Laplacian value L(k,j+1), for at least one of said points, said at least one of said points comprising a regular vertex, that is, for a vertex for which the valence "K" is equal to "six," in a triangular mesh representation, in accordance with

$$L(k,j+1) = \frac{1}{6}\left(\sum_{l\in N(k,j+1)} c^{j+1}(l)\right) - c^{j+1}(k)$$

where $c^{j+1}(k)$ represents the position of the point for which the Laplacian is being generated in the finer level mesh representation, and $c^{j+1}(l)$ represents the positions of neighboring points in the finer level mesh representation.

5. (Currently Amended) ~~An arrangement as defined in claim 2~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a

least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the Laplacian generator module is configured to generate the Laplacian value L(k,j+1), for at least one of said points, said at least one of said points comprising a for a irregular vertex, that is, for a vertex for which the valence "K" is not equal to "six," in a triangular mesh representation, in accordance with

$$L(k,j+1) = \rho\left[\frac{1}{K}\sum_{l\in N(k,j+1)} c^{j+1}(l) - c^{j+1}(k)\right]$$

where $c^{j+1}(k)$ represents the position of the point for which the Laplacian is being generated in the finer level mesh representation, and $c^{j+1}(l)$ represents the positions of neighboring points in the finer level mesh representation,

$$\rho = -\frac{3+8\alpha(K)}{3(-5+8\alpha(K))},$$

and

$$\alpha(K) = \frac{5}{8}-\left(\frac{3+2\cos\left(\frac{2\pi}{K}\right)}{8}\right)^2.$$

6. (Currently Amended) ~~An arrangement as defined in claim 2~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the Laplacian generator module is configured to generate the Laplacian value L(k,j+1), for at least one of said points, said at least one of said points comprising a point on a boundary, crease line or the like in a quadrilateral mesh representation, in accordance with

$$L(k, j+1) = \frac{1}{2}\left(c^{j+1}(k-1) + c^{j+1}(k+1)\right) - c^{j+1}(k)$$

where $c^{j+1}(k)$ is the position of the vertex for which the Laplacian is being generated, and $c^{j+1}(k-1)$ and $c^{j+1}(k+1)$ are the positions of the neighboring points in the fine level mesh representation.

7. (Currently Amended) ~~An arrangement as defined in claim 2~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and

least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the Laplacian generator module is configured to generate Laplacian values $L_e(k,j+1)$ and $L_f(k,j+1)$, for at least one of said points, said at least one of said points comprising a point on a boundary, crease line or the like in a quadrilateral mesh representation, in accordance with

$$L_e(k,j+1) = \frac{1}{K}\left(\sum_{l \in N_e(k,j+1)} c^{j+1}(l)\right) - c^{j+1}(k)$$

and

$$L_f(k,j+1) = \frac{1}{K}\left(\sum_{l \in N_f(k,j+1)} c^{j+1}(l)\right) - c^{j+1}(k)$$

where $N_e(k,j+1)$ references a set of points comprising first order neighbors of the at least one of said points in the finer level mesh representation, and $N_f(k,j+1)$ references a set of points comprising second order neighbors of the at least one operating system said points in the finer level mesh representation.

8. (Original). An arrangement as defined in claim 7 in which the coarse level mesh generator module is configured to determine, for at least one of the points that are to be provided in the coarse level mesh representation, the position in the coarse level mesh representation as the position of the corresponding point in the finer level mesh representation if the magnitude both Laplacian values $L_e(k,j+1)$ and $L_f(k,j+1)$ generated by the Laplacian generator module are below a predetermined threshold value.

9-10 (Cancelled)

11. (Currently Amended) ~~An arrangement as defined in claim 10~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator

value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the subdivision-inverse filter methodology if the magnitude of the indicator value is below a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points, comprising a point on a boundary, crease line or the like in a triangular mesh representation, for which the magnitude of the indicator value is below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) \;=\; c^{j+1}(k) + \lambda\ L(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, $L(k,j+1)$ represents the Laplacian value generated by the Laplacian generator module for the point in the finer level mesh representation, and λ represents a parameter whose value is $\lambda = -1$.

12. (Currently Amended) ~~An arrangement as defined in claim 10~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a

least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the subdivision-inverse filter methodology if the magnitude of the indicator value is below a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points in a triangular mesh representation, comprising a regular point, that is, a point whose valence "K" is equal to "six," and is not on a boundary, crease line or the like, for which the magnitude of the indicator value is below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) = c^{j+1}(k) + \lambda L(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, $L(k,j+1)$ represents the Laplacian value generated by the Laplacian generator module for the point in the finer level mesh representation, and λ represents a parameter whose value is $\lambda = -3/2$.

13. (Currently Amended) ~~An arrangement as defined in claim 10~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a

least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the subdivision-inverse filter methodology if the magnitude of the indicator value is below a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points in a triangular mesh representation, comprising an irregular point, that is, a point whose valence "K" is not equal to "six," and is not on a boundary, crease line or the like, for which the magnitude of the indicator value is below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) = c^{j+1}(k) + \lambda L(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, $L(k,j+1)$ represents the Laplacian value generated by the Laplacian generator module for the point in the finer level mesh representation, and λ represents a parameter whose value is generated in accordance with

$$\lambda = \frac{8a(K)}{-5+8a(K)},$$

where

$$a(K) = \frac{5}{8} - \left(\frac{3+2\cos\left(\frac{2\pi}{K}\right)}{8}\right)^2.$$

14. (Currently Amended) ~~An arrangement as defined in claim 10~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the subdivision-inverse filter methodology if the magnitude of the indicator value is below a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points, comprising a point on a boundary, crease line or the like in a quadrilateral mesh representation, for which the magnitude of the indicator value is below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) = c^{j+1}(k) + \lambda L(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, $L(k,j+1)$ represents the Laplacian value generated by the Laplacian generator module for the point in the finer level mesh representation, and λ represents a parameter whose value is $\lambda = -1$.

15. (Currently Amended) ~~An arrangement as defined in claim 10~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the subdivision-inverse filter methodology if the magnitude of the indicator value is below a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points in a quadrilateral mesh representation, which is not on a boundary, crease line or the like, for which the magnitude of the indicator value is below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) = c^{j+1}(k) + \lambda_1 L_e(k, j+1) + \lambda_2 L_f(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, $L_e(k,j+1)$ and $L_f(k,j+1)$ represent Laplacian values generated by the Laplacian generator module for the point in the finer level mesh representation, and λ_1 and λ_2 represent parameters whose values are generated in accordance with, if the valence "K" of the point not equal to "three,"

$$\hat{\lambda}_1 = -\frac{4}{K-3}$$

$$\hat{\lambda}_2 = \frac{1}{K-3}$$

and, if the valence "K" for the vertex is equal to "three," $\lambda_1 = -8$, $\lambda_2 = -2$.

16. (Cancelled)

17. (Currently Amended) ~~An arrangement as defined in claim 16~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the least-squares optimization methodology if the magnitude of the indicator value is above a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points, comprising a point on a boundary, crease line or the like in a triangular mesh representation, for which the magnitude of the indicator value is not below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^{j}(k) = c^{j+1}(k) + \lambda\, L(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, L(k,j+1) represents the Laplacian value generated by the Laplacian generator module for the point in the finer level mesh representation, and λ represents a parameter whose value is generated in accordance with

$$\lambda = \frac{1}{L(k)}\left[b_0^{1D}\, L(k) + \frac{1}{2} b_1^{1D} \left(L(k-1) + L(k+1) \right) \right]$$

where

$$b_0^{1D} = -\frac{12}{35} \text{ and } b_1^{1D} = -\frac{23}{49},$$

and L(k-1) and L(k+1) represent Laplacian values generated by the Laplacian generator module for neighboring points in the finer level mesh representation.

18. (Currently Amended) ~~An arrangement as defined in claim 16~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level

<u>mesh representation, in accordance with the least-squares optimization methodology if the magnitude of the indicator value is above a selected threshold value; and</u>

in which the coarse level mesh generator module is configured to determine, for at least one of said points in a triangular mesh representation, comprising a regular point, that is, a point whose valence "K" is equal to "six," and is not on a boundary, crease line or the like, for which the magnitude of the indicator value is not below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) = c^{j+1}(k) + \lambda L(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, $L(k,j+1)$ represents the Laplacian value generated by the Laplacian generator module for the point in the finer level mesh representation, and λ represents a parameter whose value is

$$\lambda = \frac{1}{L(k)}\left[b_0^{reg} L(k) + \frac{1}{6} b_1^{reg} \sum_{l \in N(k,j+1)} L(l)\right]$$

where

$$b_0^{reg} = -\frac{61}{5720} \text{ and } b_1^{reg} = -\frac{14403}{5720}$$

and $L(l)$ represent Laplacian values generated by the Laplacian operator for points, identified by indices $N(k,j+1)$, that neighbor the at least one of said points.

19. (Currently Amended) ~~An arrangement as defined in claim 16~~ <u>A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:</u>

<u>A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;</u>

<u>B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh</u>

representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the least-squares optimization methodology if the magnitude of the indicator value is above a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points in a triangular mesh representation, comprising an irregular point, that is, a point whose valence "K" is not equal to "six," and is not on a boundary, crease line or the like, for which the magnitude of the indicator value is below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) = c^{j+1}(k) + \lambda\, L(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, $L(k,j+1)$ represents the Laplacian value generated by the Laplacian generator module for the point in the finer level mesh representation, and λ represents a parameter whose value is generated in accordance with

$$\lambda = \frac{1}{L(k)}\left[b_0^{irreg} L(k) + \frac{1}{K} b_1^{irreg} \sum_{l \in N\{k,j+1\}} L(l)\right],$$

where

$$b_0^{irreg} = \frac{2\left(5-8a(K)\right)\left(14647K - 391848\,a(K) + 391848\,a(k)^2\right)}{715\left(3+8\,a(k)\right)\left(256+41K-512\,a(k)+256\,a(k)^2\right)}$$

and

$$b_1^{irreg} = \frac{16\left(-5531K - 24521\,a(K) + 24521\,a(K)^2\right)}{715\left(256+41K-512\,a(K)+25\,a(K)^2\right)}$$

and where

$$a(K) = \frac{5}{8} - \left(\frac{3 + 2\cos\left(\frac{2\pi}{K}\right)}{8} \right)^2 .$$

20. (Currently Amended) ~~An arrangement as defined in claim 16~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the least-squares optimization methodology if the magnitude of the indicator value is above a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points, comprising a point on a boundary, crease line or the like in a quadrilateral mesh representation, for which the magnitude of the indicator value is not below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) = c^{j+1}(k) + \lambda\, L(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, L(k,j+1) represents the Laplacian value generated by the Laplacian generator module for the point in the finer level mesh representation, and λ represents a parameter whose value is generated in accordance with

$$\lambda = \frac{1}{L(k)}\left[b_0^{1D}\, L(k) + \frac{1}{2} b_1^{1D}\left(L(k-1) + L(k+1)\right)\right]$$

where

$$b_0^{1D} = -\frac{12}{35} \text{ and } b_1^{1D} = -\frac{23}{49},$$

and L(k-1) and L(k+1) represent Laplacian values generated by the Laplacian generator module for neighboring points in the finer level mesh representation.

21. (Currently Amended) ~~An arrangement as defined in claim 16~~ A fine-to-coarse level mesh generating arrangement for generating a coarse level mesh representation representing a surface, from a finer level mesh representation, the arrangement comprising:

A. an indicator value generator module configured to, for respective ones of the points in the finer level surface representation, evaluate an indicator function to generate an indicator value, the indicator value indicating whether one of a subdivision-inverse filter methodology or a least-squares optimization methodology is to be used to determine a position for a corresponding point in the coarse level mesh representation;

B. a coarse level mesh generator module configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the one of the subdivision-inverse filter methodology and least-squares optimization methodology as indicated by the indicator value generated by the indicator value generator module; and

C. a Laplacian generator module configured to generate a Laplacian value for said respective ones of the points in the finer level mesh representation;

in which the coarse level mesh generator module is configured to determine, for each of the points that are to be provided in the coarse level mesh representation, a position in the coarse level mesh representation in response to the position of the corresponding point in the finer level mesh representation, in accordance with the least-squares optimization methodology if the magnitude of the indicator value is above a selected threshold value; and

in which the coarse level mesh generator module is configured to determine, for at least one of said points in a quadrilateral mesh representation, which is not on a boundary, crease line or the like, for which the magnitude of the indicator value is below the selected threshold value, a position $c^j(k)$ in the coarse level mesh representation in accordance with

$$c^j(k) = c^{j+1}(k) + \lambda_1 L_e(k, j+1) + \lambda_2 L_f(k, j+1)$$

where $c^{j+1}(k)$ represents the position of the corresponding point in the finer level mesh representation, $L_e(k,j+1)$ and $L_f(k,j+1)$ represent Laplacian values generated by the Laplacian generator module for the point in the finer level mesh representation, and λ_1 and λ_2 represent parameters whose values are generated in accordance with

$$\lambda_1 = \frac{1}{L_e(k, j+1)}\left[b_{10}^{cc} L_e(k, j+1) + \frac{1}{K} b_{11}^{cc} \sum_{l \in N(k,j+1)} L_e(l, j+1)\right]$$

and

$$\lambda_2 = \frac{1}{L_f(k, j+1)}\left[b_{20}^{cc} L_f(k, j+1) + \frac{1}{K} b_{21}^{cc} \sum_{l \in N_f(k,j+1)} L_f(l, j+1)\right]$$

where, if the at least one of said points is regular, that is, if its valence "K" is "four,"

$$b_{10}^{cc} = -\frac{9946871}{4862025}$$
$$b_{11}^{cc} = -\frac{1024}{405}$$
$$b_{20}^{cc} = \frac{1644032}{972405}$$
$$b_{21}^{cc} = -\frac{1338874}{972405}$$

and, if the at least one point is irregular, that is, its valence "K" is other than "four,"

$$
\begin{aligned}
b_{10}^{cc} &= \frac{162307143936 - 92746939392\, K - 8924282387\, K^3}{4862025\left(12544 - 14336\, K + 4096\, K^2 + 901\, K^3\right)} \\
b_{11}^{cc} &= \frac{1024\left(2793728 - 1596416\, K - 244001\, K^3\right)}{99225\left(12544 - 14336\, K + 4096\, K^2 + 901\, K^3\right)} \\
b_{20}^{cc} &= \frac{512\left(-113305472 + 64745984 K + 17391149\, K^3\right)}{4862025\left(12544 - 14336 K + 4096\, K^2 + 901\, K^3\right)} \\
b_{21}^{cc} &= \frac{4\left(8660934688 - 4949105536\, K - 1876158821\, K^3\right)}{4862025\left(12544 - 14336\, K + 4096\, K^2 + 901\, K^3\right)}
\end{aligned}
$$

22-63 (Cancelled)